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Claims

1. A device (200, 300) for patterning structures (207, 307) on a substrate (201, 301) comprising:
an Atomic Force Microscope (202, 302) having a scanning tip (203, 303);
a light emitting device (204, 304), and
a space around the scanning tip, which space comprises a vapour of a material which is suitable for Chemical Vapour Deposition onto the substrate (201, 301) when decomposed,
wherein the light emitting device (204, 304) is adapted to emit a light beam (206, 306), which light beam has an intensity that is not capable to decompose the vapour, onto the tip (203, 303) in such a way that an electromagnetic field induced by the light beam (206, 306) near the tip (203, 303) is high enough to decompose the vapour.
2. The device according claim 1, wherein the light emitting device (204, 304) is a laser.
3. The device according claim 1 or 2, wherein the laser device (204, 304) is adapted to emit the light beam (206, 306) onto the tip (203, 303) in such a way that the polarization is parallel to a longitudinal axis of the tip (203, 303).
4. The device according to anyone of the claims 1 to 3, wherein the tip (203, 303) has a dimension between 5 nm and 20 nm.
5. The device according to anyone of the claims 1 to 4, wherein the device comprises a plurality of substantially parallel tips (303a, 303b, 303c, 303d).

IS 14/3636

CH920030009

6. The device according to anyone of the claims 1 to 5, wherein the wavelength of the light beam (206, 306) is adapted to match the size of the tip (203, 303) so that a sufficient amplification of the emitted light beam is achieved.

7. The device according to anyone of the claims 1 to 6, wherein one or more of the tips (203, 303a, 303b, 303c, 303d) are metalized.

8. The device according to anyone of the claims 1 to 6, wherein the vapour is a gas out of a group of gases comprising Halides, Hydrides, and Metal Organic Compounds.

9. The device according to anyone of the claims 1 to 8, wherein the vapour is a gas out of a group of gases comprising AuClPF_3 , W(CO)_6 , TiCl_4 , TaCl_5 , WF_6 , SiH_4 , GeH_4 , $\text{AlH}_3(\text{NMe}_2)_2$, NH_3 , AlMe_3 , $\text{Ti(CH}_2\text{tBu)}_4$, Ti(OiPr)_4 , $\text{Ti(NMe}_2)_4$, Cu(acac)_2 , and Ni(CO)_4 .

10. A method for patterning structures (207, 307) on a substrate (201, 301) by a device including an Atomic Force Microscope (202, 302) and a light emitting device (204, 304), the method comprising the steps of:

providing the substrate (201, 301) underneath a tip (203, 303) of the Atomic Force Microscope (202, 302);

providing a vapour of a material, which is suitable for Chemical Vapour Deposition onto the substrate (201, 301) when decomposed, in a space between the tip (203, 303) and the substrate (201, 301); and

exposing the tip (203, 303) to a light beam (206, 306) emitted by the light emitting device (204, 304), wherein an intensity of the light beam (206, 306) is not enough to decompose the vapour, in such a way that the tip (203, 303) intensifies the electromagnetic near-field to an extend that the vapour is decomposed.